ALGEBRA

C–8

69. If $20X^2 - 30X + 1 = 0$, then what is the value of $\left(25x^2 + \frac{1}{16x^2}\right) = ?$

(A) $58\frac{3}{4}$ (B) $53\frac{3}{4}$

(C) $53\frac{1}{2}$ (D) $58\frac{1}{2}$

SSC CGL 2019

$20x^2 - 30x + 1 = 0$

$\Rightarrow 5x + \frac{1}{4x} = \frac{30x}{4x} = \frac{15}{2}$

$(5x)^2 + \left(\frac{1}{4x}\right)^2$

$= \left(\frac{15}{2}\right)^2 - 2 \times 5x \times \frac{1}{4x}$

$= \frac{225}{4} - \frac{5}{2}$

$\frac{225}{4} - \frac{10}{4}$

$= \frac{215}{4}$

$215 \div 4 = 53\frac{3}{4}$

70. If $X - \frac{2}{X} = 15$ then what is the value of $\left(x^2 + \frac{4}{x^2}\right)$?

(A) 227
(B) 221
(C) 223
(D) 229

SSC CGL 2020

$(x)^2 + \left(\frac{2}{x}\right)^2$

$= (15)^2 + 2 \times x \times \frac{2}{x}$

$= 225 + 4$

71. If $(2X - \frac{3}{X}) = 2$ then what is the value of $(16x^4 + \frac{81}{x^4})$?

(A) 184 (B) 328
(C) 180 (D) 220

SSC CGL 2020

$$\left(2x - \frac{3}{x}\right)^2 = (2)^2$$

$$\Rightarrow 4x^2 + \frac{9}{x^2} - 2 \times 2x \times \frac{3}{x} = 4$$

$$\Rightarrow \left(4x^2 + \frac{9}{x^2}\right)^2 = (16)^2$$

$$\Rightarrow 16x^4 + \frac{81}{x^4} + 2 \cdot 4x^2 \cdot \frac{9}{x^2} = 256$$

$$\Rightarrow 16x^4 + \frac{81}{x^4} = 184 \quad A$$

256
− 72
184

72 If $X^4 + X^{-4} = 47$, $(X>0)$ then the value of $(2x - 3)^2$ is :

(A) 2
(B) 3
(C) 5
(D) 4

SSC CHSL 2019

$x^4 + \frac{1}{x^4} = 47$

$\Rightarrow x^2 + \frac{1}{x^2} = \sqrt{47+2}$

$= \sqrt{49} = 7$

$\Rightarrow x + \frac{1}{x} = 3$

$\Rightarrow \frac{x^2+1}{x} = 3$

$\Rightarrow x^2 + 1 = 3x \Rightarrow x^2 - 3x = -1$

$4x^2 - 12x + 9$

$\Rightarrow 4(x^2 - 3x) + 9$

$\Rightarrow 4(-1) + 9$

$= 5$

73. If $X^4 + X^{-4} = 194$,($X>0$) then the value of $(2x - 4)^2$ is :

(A) 16 (B) 15
(C) 20 (D) 12

SSC CHSL 2019

$$x^4 + \frac{1}{x^4} = 194$$

$$x^2 + \frac{1}{x^2} = 14$$

$$x + \frac{1}{x} = 4$$

$$\Rightarrow \frac{x^2+1}{x} = 4$$

$$\Rightarrow x^2 + 1 = 4x$$

$$\Rightarrow x^2 - 4x = -1$$

$$4x^2 - 16x + 16$$

$$= 4(x^2 - 4x) + 16$$

$$= 4(-1) + 16 = 12$$

74. If $x+\frac{1}{x}=2$, then find the value of: $X^{1823}+\frac{1}{x^{1929}}$

(A) 2
(B) 1
(C) 0
(D) -1

SSC CHSL 2023

$x=1$

$\rightarrow 1+\frac{1}{1}$

$=1+1$

$=2$

75. If $\left(x+\frac{1}{x}\right) = 2$, then $X^7+\frac{1}{x^{117}} = ?$

(A) 1

(B) 2

(C) 4

(D) 3

SSC CGL 2023

$x^7 - \frac{1}{x^{117}} + 13$

$= 13$

$1 + \frac{1}{1}$

$= 2$

76. If $\frac{x}{y}+\frac{y}{x}=2$, (x ,y ≠0) then the value of (x - y) is:

(A)-2
(B) 1
(C) 2
(D) 0

SSC CHSL 2023

$\frac{x}{y}+\frac{y}{x}$

$\frac{2}{2}+\frac{2}{2}$

$=2$

$x=y=1$

$x=y=2$

$x-y$

77. Given, $a + \frac{1}{a} = 2$, what is the value of $(a^{118} + \frac{1}{a^{117}})$?

(A) 118

(B) 1

(C) 2

(D) 117

SSC CHSL 2023

78. If $K+\left(\frac{1}{k}\right) = 2$ find the value of $8k \times k \times k$?

(A) 8 (B) 1
(C) 4 (D) 2

$k + \frac{1}{k} = 2$

$k = 1$

$8 \times 1 \times 1 \times 1$

$= 8$

CGL/CHSL

79. If $a+\frac{1}{a}+2=0$ then the value of $a^{15}-\frac{1}{a^{100}}$ is

(A) 0 (B) 2

(C) -2 (D) 1

$a+\frac{1}{a}=-2$

$a=-1$

$a^{15}-\frac{1}{a^{100}}$

$=(-1)^{15}-\frac{1}{(-1)^{100}}$

$=-1-\frac{1}{1}$

$=-1-1=-2$

79. If $a+\frac{1}{a}+2=0$ then the value of $a^{16}-\frac{1}{a^{100}}$ is

(A) 0
(B) 2
(C) -2
(D) 1

$a+\frac{1}{a}=-2$

$a=-1$

$a^{16}-\frac{1}{a^{100}}$

$(-1)^{16}-\frac{1}{(-1)^{100}}$

$=1-\frac{1}{1}$

$=1-1$

79. If $a+\frac{1}{a}+2=0$ then the value of $a^{23}-\frac{1}{a^{111}}$ is

(A) 0 (B) 2
(C) -2 (D) 1

$$a+\frac{1}{a}=-2$$

$$a=-1$$

$$a^{23}-\frac{1}{a^{111}}$$

$$=(-1)^{23}-\frac{1}{(-1)^{111}}$$

$$=-1-\frac{1}{-1}$$

$$=-1+1=0$$

A

80 If $k + \frac{1}{k} + 2 = 0$ and $k < 0$, then what is the value of $k^{17} + \frac{1}{k^{11}}$?

(A) -17
(B) -2
(C) -1
(D) 0

SSC CHSL 2023

$k + \frac{1}{k} = -2$

$k = -1$

$k^{17} + \frac{1}{k^{11}}$

$= -1 + \frac{1}{-1}$

$= -1 - 1 = -2$

80. If $k + \frac{1}{k} + 2 = 0$ and $k < 0$, then what is the value of $k^{17} + \frac{1}{k^{18}}$?

(A) -17
(B) -2
(C) -1
(D) 0

SSC CHSL 2023

$k + \frac{1}{k} = -2$

$k = -1$

$k^{17} + \frac{1}{k^{18}}$

$= -1 + \frac{1}{1}$

$= -1 + 1 = 0$

$$(-2)^3$$

$$= (-2)(-2)(-2)$$

$$= \boxed{-8}$$

$$(-2)^2$$

$$= (-2)(-2)$$

$$= 4$$

2, 4, 6, 8 ...

1, 3, 5, 7, 9, 11 ...

81. If $k+\frac{1}{k}+2=0$ and $k<0$, then what is the value of $k^{11}+\frac{1}{k^4}$?

(A) 0

(B) -2

(C) -1

(D) -17

SSC CGL 2022

$$K+\frac{1}{K}=-2$$

$$K=-1$$

$$K^{11}+\frac{1}{K^4}$$

$$(-1)^{11}+\frac{1}{(-1)^4}$$

$$=-1+\frac{1}{1}=-1+1=0$$

82. If $x^2 - 9x + 1 = 0$ what is the value of $x^8 - 6239x^4 + 1$?

(A) 1
(B) 0
(C) -1
(D) 2

SSC CHSL 2022

$$x^2 - 9x + 1 = 0$$

$$\Rightarrow (x^2+1)^2 = (9x)^2$$

$$\Rightarrow x^4 + 2x^2 + 1 = 81x^2$$

$$\Rightarrow (x^4+1)^2 = (79x^2)^2$$

$$\Rightarrow x^8 + 2x^4 + 1 = 6241x^4$$

$$\Rightarrow x^8 + 1 = 6239x^4$$

$$\Rightarrow x^8 - 6239x^4 + 1 = 0$$

$$(79)^2 =$$